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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/630,228	08/01/2000	David Alan Burton	TUC920000013US1	6085
24033	7590	11/10/2004	EXAMINER	
KONRAD RAYNES & VICTOR, LLP 315 S. BEVERLY DRIVE # 210 BEVERLY HILLS, CA 90212			ANDERSON, MATTHEW D	
		ART UNIT	PAPER NUMBER	
		2186		

DATE MAILED: 11/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/630,228	BURTON ET AL.	
	Examiner	Art Unit	
	Matthew D. Anderson	2186	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 12 October 2004.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) 2-5,7-14,17-20,22-29,32-35,37-41,44,45 is/are allowed.
- 6) Claim(s) 1,15,16,30,31,42,43 and 47 is/are rejected.
- 7) Claim(s) 6,21,36 and 46, 48 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 01 August 2000 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413) Paper No(s). _____ .
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)
 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s). Other:

DETAILED ACTION

Response to Amendment

1. In response to the amendment filed 5/18/04:

claims 1-2, 4, 10, 16-17, 19, 25, 32, 32, 34, 40, 43-44, and 47 have been amended;
claims 49-51 have been canceled.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 16, 31, and 43 are rejected under 35 U.S.C. 102(b) as being anticipated by Brant *et al.* (US Patent # 5,548,711).

4. With respect to claims 1, 16, 31, and 43, Brant *et al.* disclose:a storage device and cache, as shown by the storage units 7 and copyback caches CC in figure 1;

means for receiving an update to one or more blocks of customer data at addresses in the storage device, as recited in column 4, lines 60-62;

for each block of data to update, means for generating metadata indicating the address of the block in the storage device (column 21, lines 37-40) and an error checking code that is capable of being used to determine whether the customer data in the block has changed, wherein

the error checking code is generated (or calculated) from the customer data , as recited in column 5, lines 1-10;

means for each block of data to update, writing the block of data to update and the metadata for the block to cache; and for each block of data to update, transferring the block of data and the metadata for the block from the cache to the storage device, as recited in column 4, lines 60-65.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 15, 30, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brant *et al.* and Cheong *et al.* (US Patent # 5,533,189).

7. With respect to claims 15, 30, and 42, Brant *et al.* disclose all limitations of the parent claims, but fail to specifically teach the error checking code being used to determine changes to the metadata. Cheong *et al.* disclose the error checking code being further capable of being used to determine whether the metadata in the block has changed, as recited in column 1, line 60 through column 2, line 5.

8. It would have been obvious to one of ordinary skill in the art, having the teachings of Brant *et al.* and Cheong *et al.* before him at the time the invention was made, to modify the hierarchical cache recovery system taught by Brant *et al.*, to have the error checking code find

changes to the metadata, as with the hierarchical cache recovery system of Cheong *et al.*, in order to prevent a loss of data due to the use of invalid or earlier version data, as taught by Cheong *et al.*.

9. Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brant *et al.* and DeKoning *et al.* (US Patent # 5,761,705).

10. With respect to claims 47, Brant *et al.* teach all other features of the claims, as discussed above in the other independent claims, but fail to specifically disclose the blocks of data and metadata being stored in a nonvolatile portion of the cache and cache control blocks being stored in the volatile portion of the cache. DeKoning *et al.* teach in column 8, lines 13-18, that the actual cached data and smaller control blocks (metadata) are stored in the non-volatile portion of the cache memory subsystem, and the recovery control blocks are used to recover the cache control blocks (CCBs) in the volatile portion of the cache memory subsystem.

11. It would have been obvious to one of ordinary skill in the art, having the teachings of Brant *et al.* and DeKoning *et al.* before him at the time the invention was made, to modify the hierarchical cache recovery system taught by Brant *et al.*, to include a cache with volatile and nonvolatile portions, as with the hierarchical cache recovery system of DeKoning *et al.*, in order to recover data in a redundant system, as taught by DeKoning *et al.*.

Allowable Subject Matter

12. Claims 2-5, 7-14, 17-20, 22-29, 32-35, 37-41, and 44-45 are allowed.

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13. Claims 6, 21, 36, 46, and 48 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

14. The following is a statement of reasons for the indication of allowable subject matter: the prior art does not teach or suggest the combination of claim elements specifically including the following:

[Claims 2, 17, 32]: for each block of data to update, performing an operation on the customer data in the block and the error checking code to determine whether the customer data has changed, wherein the block of data to update and metadata for the block is transferred to the storage device if the address of the block in the metadata and requested address match and the customer data has not changed.

[Claims 4, 19, 34, 44, and 46]: setting up a control block including the address of a first block of data to update in the storage device and an instruction to generate the address and error code as metadata for the block, wherein generating the metadata indicating the address of the block in the storage device comprises using the block address in the control block as the address of the block in the storage device to write as metadata.

[Claims 6, 21, and 36]: XOR'ing the customer data, not the metadata as in Cheong.

[Claims 10, 25, and 40]: recovering from a power loss, and using the metadata for blocks in cache to rebuild cache control blocks for the blocks in cache after recovering from the power loss.

[Claim 48]: a first data structure indicating whether each block of data in cache is valid or invalid and a second data structure indicating whether each block of data includes modified or

unmodified data, wherein the error checking code is used to determine whether each block of data in the cache has changed in the event of a data recovery event, wherein the first data structure is modified to indicate that a block of data is invalid if the second data structure indicates that the block of data is not modified and the block of data has changed.

Response to Amendment

15. In response to the amendment filed 10/12/04: claims 43 and 47 have been amended, and the corresponding USC 112 rejection has been withdrawn.

Response to Arguments

16. Applicant's arguments filed 10/12/04 have been fully considered but they are not persuasive.

17. With respect to claims 1, 16, and 31, the Applicant alleges that Brant does not disclose generating metadata that for each block of data to update indicating the address of the block in the storage device and writing that metadata with the block of data to update. Column 22, lines 59+ of Brant recite that when data is received by the controller from the CPU, the write data is coupled to a DMA controller within the primary or secondary memory interface 808, 811 together with a starting address and the number of bytes of data to be stored. In other words that write data is written together with the starting address.

18. With respect to claims 1, 16, and 31, the Applicant alleges that Brant does not disclose the metadata including both the address of the block in the storage device and an error checking code generated from the customer data. The teaching for address of the block is discussed

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above. The cited section of column 5 teach that the error correction block is an XOR parity for each pending block. An XOR parity provides an exclusive OR parity comparison of the pending block to determine its accuracy (i.e., if it has changed).

19. With respect to claims 1, 16, and 31, the Applicant alleges that Brant does not disclose that the metadata and the update are first written to cache and then to the storage device. The cited portion of Brant show how data is written to the copyback cache, and then copied back to the RAID storage device.

20. The Applicant alleges that Brant does not teach the features of claims 43 and 15, 30, and 42 for the same reasons as those discussed previous with respect to claims 1, 16, and 31. Accordingly, these arguments are addressed likewise above.

Conclusion

21. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

22. The prior art made of record on form PTO-892 and not relied upon is considered pertinent to applicant's disclosure. Applicant is required under 37 C.F.R. § 1.111(c) to consider these references fully when responding to this action. The documents cited therein teach similar error correction systems.

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew D. Anderson whose telephone number is (571) 272-4177. The examiner can normally be reached on Monday-Friday, 2nd Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew M. Kim can be reached on (571) 272-4182. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.



Matthew D. Anderson
Primary Examiner
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